Appendix 8

Meadowbank 2023 Annual Open Pit Geomechanical Inspection

Knight Piésold CONSULTING

Management System Certified by: bsi ISO 9001 ISO 14001 ISO 45001 CERTIFIED

September 26, 2023

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Dear Christian,

RE: Meadowbank Complex - Meadowbank Site - 2023 Annual Open Pit Geomechanical Inspection

1.0 INTRODUCTION

Agnico Eagle Mines Limited (AEM) operates the Meadowbank Complex, in Nunavut, Canada. The complex consists of the Meadowbank and Amaruq Sites. The Meadowbank Site consists of the Portage, Goose, Vault, and Phaser deposits. The deposits were mined using a series of open pits and mining is now complete. An annual inspection of the open pits by a third-party is required under the Type-A, Part 1, Item 2 Water License for the mine. Mr. Ben Peacock P.Eng. of Knight Piésold Ltd. (KP) completed the inspection of the open pits with Mr. Christian Tremblay (Rock Mechanics Coordinator) of AEM on July 7, 2023.

2.0 OPEN PITS INSPECTED

Open pit mining at the Meadowbank Site ended in 2019 and this has resulted in decreased activity around the open pits. The open pits are partially flooded and several have been partially or completely backfilled with waste rock or tailings. In general, this has both reduced the likelihood of a failure occurring and the consequences if a failure occurs. As a result of these changes to the geomechanical risk profile, there has been a reduction in monitoring and inspections at the Meadowbank Site. However, it is important to note that hazards continue to be present and, in some cases, new hazards have developed as a result of these changes. The open pits included in the inspection and their current status are summarized in Table 1.

The results of the inspection are summarized in Appendix A.

Table 1 Open Pits Inspected and their Status

Open Pit	Current Status
Portage Pit A	Inactive, inactive in-pit waste rock dump, partially flooded and actively used for water management
Portage Pit B	Inactive, backfilled with waste rock (B Dump)
Portage Pit C	Inactive, backfilled with waste rock (C Dump)
Portage Pit D	Inactive, backfilled with waste rock (D Dump)
Portage Pit E	Inactive, inactive in-pit waste rock dump, partially flooded and actively used for tailings deposition
Goose Pit	Inactive, inactive in-pit waste rock dump, partially flooded, previously used for tailings deposition with the potential for future deposition
Vault Pit	Inactive, inactive in-pit waste rock dump, partially flooded
Phaser Pit	Inactive, partially flooded
BB Phaser Pit	Inactive, partially flooded

3.0 2023 INSPECTION RESULTS

Observations made during the site visit were grouped according to the following four headings at AEM's request:

- **Priority 1 (P1):** A high priority or structural safety issue considered immediately dangerous to life, health, or the environment. Also includes issues with a significant risk of regulatory enforcement.
- **Priority 2 (P2):** An issue that, if not corrected, could plausibly result in a structural safety issue leading to injury, environmental impact, or significant regulatory enforcement. Also includes repeated deficiencies that demonstrate a systematic breakdown of procedures.
- **Priority 3 (P3):** Single occurrences of deficiencies or non-conformances that in isolation are unlikely to result in structural safety issues. Also includes recommendations for pro-active measures important to the validation of the open pit slope design.
- **Priority 4 (P4):** Opportunity for improvement, for example to meet industry best practices.

New findings as well as the status of findings from previous annual inspections are summarized in Table 2. The details and context for each observation are provided in Appendix A.

4.0 CLOSING

We trust this letter meets your present needs. Please do not hesitate to contact us should you require anything further.

Yours truly,

Prepared:

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Specialist Engineer | Associate

Reviewed:

Robert A. Mercer, Ph.D., P.Eng.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
B.D. PEACOCK
LICENSEE
2023-09-26
NT/NU

PERMIT TO PRACTICE
KNIGHT PIESOLD LTD.
Signature
Date 2023-09-26
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

Approval that this document adheres to the Knight Piésold Quality System:

Attachments:

Table 2 Rev 0	Summary of Recommendations
Appendix A	Meadowbank Complex - Meadowbank Site - 2023 Annual Open Pit Geomechanical Inspection

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TABLE 2

AGNICO EAGLE MINES LTD. - MEADOWBANK COMPLEX
MEADOWBANK SITE

2023 ANNUAL OPEN PIT GEOMECHANICAL INSPECTION
SUMMARY OF RECOMMENDATIONS

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Category	Original Recommendation	2023 Status and Comments	2023 Recommendations	Priority
Geotechnical Inspections and Reporting, and Rockfall Log	As the pits transition into various states of closure or use for water management and tailings, the need for bi-weekly instrumentation monitoring and quarterly inspection summaries can be reduced or in some cases eliminated. In some other cases, the instrumentation has been re-purposed. Complete transition to formal monthly geotechnical inspections supported by regular informal day-to-day observations.	Monthly inspections of the open pits and in-pit waste rock dumps are completed by the Geotechnical Group. The inspections are documented in a report with photos and a hazard map. Inspections are often timed to occur shortly before Environmental Staff enter the open pits during the summer months for water sampling. The inspection reports have been updated to include the Goose Pit ramp, the seepage from the toe of the D Dump, the Portage Pit E ramp, and the Vault Ring Road. However, the Portage Pit A ramp and the Vault Pit ramp are not included in the reports.	The inspections of the ramps used to access the pit lakes at Portage Pit A and Vault Pit should be documented in the inspection report during the periods when the open pits are accessed.	P2
	The visual inspections are currently completed on a monthly basis, regardless of the identified hazards. A formal mechanism should be developed to increase the frequency of visual inspections in response to defined criteria.	The Meadowbank Open Pit Surveillance Program procedure includes a requirement for completing additional inspections in the event of a failure or unusual occurrence.	Complete.	Complete
	The visual inspections are completed by the Geotechnical Group. While several members of the group have experience monitoring open pit slopes, the group's focus is on the management of the dykes and tailings facilities. Recommend implementing an annual visual inspection of the open pits and in-pit waste rock dumps by the Rock Mechanics Group.	An annual over-inspection by the Rock Mechanics Group has been included. The most recent one was in April 2023.	Complete.	Complete
	The hazard assessment map captures many, but not all, of the hazards identified during the annual inspection. Comments have also been provided on several of the risk ratings. The hazard map should be reviewed and updated to reflect the outcome of the annual inspection.	The hazard map reflects the current hazards at the mine.	Complete. The hazard map should be updated with new drone imagery when it is available as the current imagery is significantly out of date.	Complete
	Continue to record and report (as appropriate) rockfall events that are within the pits used for tailing and water management and where there is the potential for worker access.	Rockfalls are documented in the monthly inspection reports. A single rockfall was reported over the last year (Pit E, June 2023) and reported to the WSCC.	Complete	Complete
	The Ground Control Management Plan (GCMP) for the Meadowbank Site has not been updated since 2018. Review and update the GCMP. The GCMP could be consolidated with the one for the Amaruq Site.	The inspection and reporting requirements for the Meadowbank Site (Meadowbank Open Pit Surveillance Program) are now included as an appendix to the GCMP for the Amaruq Site.	Complete	Complete
		Key documents for the design and performance of the Meadowbank open pits are not listed in the GCMP. This information is valuable for closure of the open pits or the interpretation of any future instabilities, and there is a possibility that it may be lost or forgotten over time.	Reference key open pit design documents and open pit slope performance data for Meadowbank in the GCMP so that the information is not lost.	P4
Instrumentation	Instruments relating to the open pits and hence tailings management facilities are located at Goose Pit, Pit E (south crest), and Vault Pit. There are additional in-field instrumentation between Goose Pit and Pit E, and additional instrumentation along the dikes. Some monitoring of instrumentation, such as TDR cables and inclinometers, can be suspended. Monitoring of piezometers and thermistors installed behind the South Wall of Pit E and the East Wall of Goose Pit should continue to build a record of ground thermal and piezometric response to the addition of tailings.	The TDR cables, inclinometers and many of the piezometers and thermistors used to monitor the open pits have been decommissioned. The piezometers and thermistors in the South Wall of Pit E continue to be monitored by the Geotechnical Group. The piezometers and thermistors in the East Wall of the Goose Pit are no longer monitored as tailings deposition has stopped.	This recommendation is being closed as the instrumentation is no longer required to manage the performance of the open pit slopes. Consider periodically monitoring the piezometers and thermistors in the East Wall of the Goose Pit given the potential for future tailings deposition.	N/A
	There is an opportunity to use imagery from the site drone surveys to evaluate the subsidence of the Goose Pit Waste Rock Dump, B Dump, C Dump, D Dump and Vault Pit Waste Rock Dump using photogrammetry. Recommend completing an assessment on an annual basis to supplement the existing visual inspections.	Settlement continues to be observed at the Goose Pit Waste Rock Dump, B Dump and D Dump, all of which extend into open pit lakes that are periodically accessed. Extensometers and survey points have been installed to allow for point measurements of settlement at each of the dumps. However, spatial trends are not captured.	Complete an annual drone photogrammetry assessment of the B Dump, D Dump, and Goose Pit Waste Rock Dump to better understand spatial patterns in the displacement.	P3
		The interpretation of the tension cracks at the Goose Pit Waste Rock Dump, B Dump and D Dump is based on the expectation that the cracks line up with the crest of the rock benches underlying the dumps. In 2022 it was recommended that the position of the cracks be surveyed to confirm this assessment. This has not been done.	Survey the approximate limits of the tension cracks on the B Dump and D Dump, and compare the position of the cracks to the position of the open pit benches. Consider doing the same for the Goose Pit Waste Rock Dump.	P3
	-	Extensometers are installed at the B Dump and D Dump, and survey pins installed at the Goose Pit Waste Rock Dump to monitor settlement. The extensometer data are graphed. Several of the graphs are plotting incorrect values, including the daily displacement rate and cumulative displacement. This directly impacts the interpretation of the data relative to the TARP The survey pin data are graphed. For both data sets, the daily displacement rate is average over the lifespan of the instrument.	Review and revise the graphs plotting the extensometer and survey pin data. The daily deformation rate should be calculated over a shorter time interval, such as since the last reading, to capture sudden changes and allow for a better comparison with the TARP. The graphs should be reviewed for trends each time data are collected.	P2
Portage Pit B and B Dump	The B Dump platform has experienced settlement and the formation of sinkholes and tension cracks. The sinkholes are on the main platform at approximately 5126 mRL; a depression was noted on the platform directly above. It is thought that ice and snow accumulate in the depression and contribute to sinkhole formation on the lower bench during freshet. If practical the depression at the north end of the upper dump should be backfilled and graded to prevent the release of water to the lower dump platform and the ongoing development of sinkholes.	Neither the upper platform nor the lower platform have been graded to limit water ponding and infiltration. The sinkholes do not appear to have changed significantly since 2022. The tension cracks along the western limit of the lower dump platform appear to have progressed since 2022. New tension cracks have appeared on the northern end of the upper dump platform, approximately in line with those on the lower platform. These cracks may line up with the crest of the open pit ramp buried by the dump and are linked to the increasing water level in the open pit.	The recommendation for grading the depressions on the dump platform to limit infiltration is being closed. The performance of the dump is being controlled by the increasing elevation of the pit lake rather than the infiltration of surface water.	N/A
	-	The possibility of the settlement of the B Dump progressing back to the Amaruq Road was discussed in 2022 and concluded to be unlikely as the settlement and tension cracks appear to be limited to within the footprint of the pit. SNC Lavalin was retained by AEM to complete a detailed assessment in order to confirm this conclusion.	Review the results of the SNC Lavalin assessment when they become available.	P3
C Dump	The ABF garage structure has been constructed within 35 to 47 m from the dump crest. As the water in Pit A/B rises it will infiltrate the dump material. Settlement could occur that will affect the garage foundation and building structural integrity. An alternate location should be identified for the garage structure that is outside the tailings management areas.	The ABF Garage has been relocated away from the C Dump and tailings management areas. A berm is present approximately 25 m back from the crest of the dump.	Complete. The on-going use of the dump (outside of the bermed off areas) as a laydown is considered acceptable so long as no evidence of instability is observed.	Complete
	Once the ABF structure has been relocated maintain the C Dump crest as closed and inactive with appropriate barrier berms.			
	No permanent facilities to be constructed on dump platform.	A sea can used to provide power to the dewatering infrastructure in Pit A has been re-located outside the bermed-off area along the crest of the dump. An associated electrical distribution panel remains inside the bermed-off area.	Relocate the electrical distribution panel outside of the bermed-off area along the crest of the dump before the water level in Pit A reaches the toe of the dump.	P4
D Dump	As the lake level in Pit E rises, additional platform settlement should be expected, and shallow sliver failures may occur on the dump face. Maintain and monitor the existing wireline extensometer to monitor dump stability in the area above the access ramp which will be used to access pump controls and the pump station during filling of the Pit E tailings area.	The wireline extensometers are maintained and monitored by the Geotechnical Group. Two additional extensometers (for a total of four) were installed in 2022. A TARP exists for the extensometers and they are currently measured every two weeks (approx.).	Complete. Recommendations relating to the graphing and interpretation of the data are provided under "Instrumentation" above.	Complete
Portage Pit E and Tailings Management Facility	The rockfall protection berm on the west edge of the West Wall ramp should continue to be maintained as long as personnel access the pit for pump maintenance or moving of water reclaim line.	A second, larger rockfall berm was constructed in 2021. The berm has capacity to retain future rockfall. All of the material from the failure in June, 2023 was retained by the berm and capacity remains.	Complete.	Complete
Vault Pit and In-Pit Dumps	Maintain restricted access to the open pit and dumps.	Access to the Vault Waste Rock Dump has been re-established to facilitate crushing operations.	This recommendation is being closed as the Vault Waste Rock Dump is outside of the open pit and operations at the dump are on-going. Access to the dump will be managed under existing processes.	N/A
	-	The stability of the Amaruq AWR embankment could be impacted if the water level in the Phaser Pit increases and water ponds behind the embankment. While this is checked during the visual inspections, the purpose for doing so is not set out in any of the existing documents or procedures,	Update the Meadowbank Project Open Pit Surveillance Program procedure (Appendix K of the GCMP) to note the need to monitor the water level in the Phaser Pit as part of the visual inspections and the potential for the stability of the AWR embankment to be impacted if water ponds behind the embankment.	P4

NOTES:
1. ORIGINAL RECOMMENDATIONS FROM TETRA TECH (2021).
2. STATUS AND PRIORITY HAS BEEN UPDATED TO REFLECT THE RESULTS OF THE 2023 ANNUAL INSPECTION.

REV	DATE	DESCRIPTION	PREPD	RVWD
0	26SEP23	ISSUED WITH LETTER NB23-01024	BDP	RAM

APPENDIX A

Meadowbank Complex - Meadowbank Site - 2023 Annual Open Pit Geomechanical Inspection

(Pages A-1 to A-39)

Meadowbank Complex - Meadowbank Site

2023 Annual Open Pit Geomechanical Inspection

July 7, 2023

Knight Piésold CONSULTING

Adding value. Delivering results.

Outline

- Introduction
- Observed Slope Performance
- Monitoring and Inspections
- Recommendations

Introduction

Introduction

General

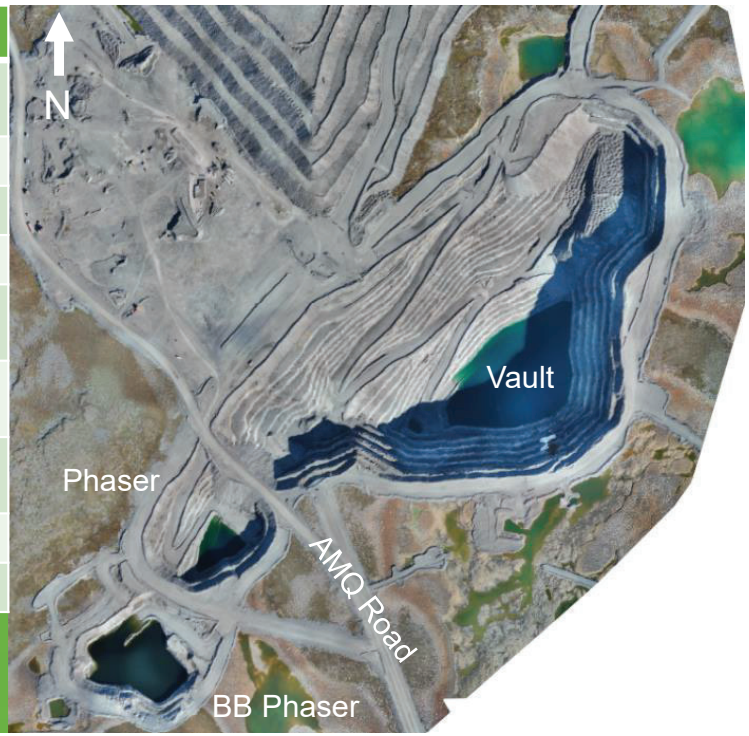
- Agnico Eagle Mines (AEM) operates the Meadowbank Complex in Nunavut. The complex consists of the Meadowbank and Amaruq Sites.
- The Meadowbank Site consists of the Portage, Goose, Vault and Phaser deposits. The deposits were mined using a series of open pits and mining is now complete. The Portage and Goose open pits are currently being used for tailings, waste rock and water management.
- An annual inspection of the open pits by a third-party is required under the Type-A, Part 1, Item 12 Water License for the mine.
- The 2023 annual inspection of the open pits was carried out by Mr. Ben Peacock, P.Eng. of Knight Piésold Ltd. and Mr. Christian Tremblay of AEM on July 7, 2023. The observations are summarized in this presentation.

Introduction

Meadowbank Site Open Pits

- The open pits at the Meadowbank Site that were reviewed and their current status are summarized below.
- Note that all elevations presented are in meters Relative Level (mRL), which uses a datum 5000 m below sea level. The presented drone photos are from 2021 as new photos are not available.

Open Pit	Current Status
Portage Pit A	Mining complete, actively used for water management, inactive in-pit dump
Portage Pit B	Backfilled with waste rock
Portage Pit C	Backfilled with waste rock
Portage Pit D	Backfilled with waste rock
Portage Pit E	Mining complete, active tailings deposition, inactive in-pit dump
Goose Pit	Mining complete, partially flooded, inactive tailings deposition with the potential for future deposition
Vault Pit	Mining complete, partially flooded, inactive in-pit dump
Phaser Pit	Mining complete, partially flooded
BB Phaser Pit	Mining complete, flooded



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Observed Slope Performance

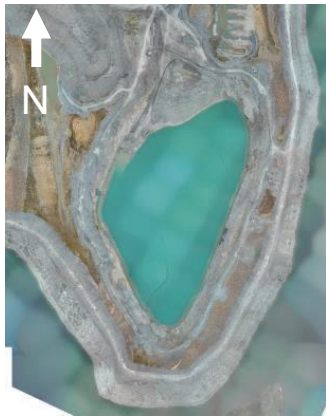
Observed Slope Performance

Goose Open Pit - General

- Mining of the open pit is complete. An inactive in-pit dump is present along the North Wall of the open pit (the North Waste Rock Dump). The approximate current pit geometry is shown at right (as of 2021).
- The open pit reached a final floor elevation of 4997 mRL, with a crest elevation of approximately 5130 mRL.
- Tailings was previously deposited in the open pit from a spigot point on the East Wall to an elevation of 5086 mRL. It is understood that future deposition of tailings is likely to be limited. The water elevation at the time of the inspection was approximately 5114.3 mRL.
- The dump platform is at approximately 5125 mRL.
- Access to the open pit is infrequent, typically limited to monthly water quality sampling when the pit lake is not frozen.
- The East Wall of the open pit was instrumented with Time Domain Reflectometry (TDR) cables, Vibrating Wire Piezometers (VWPs) and thermistors. These instruments are no longer monitored from a geomechanical perspective. The instrumentation is discussed later in this presentation.
- Observations made during the inspection are summarized on the following slide.

Observed Slope Performance

Goose Open Pit



- A portion of a single bench is exposed above the current pit lake.
- The walls are performing well and no particular geomechanical concerns were noted.
- The exposed bench faces along the ramp at the northern end of the pit are relatively low and there is ample room to transit and work away from the wall. As a result, the rockfall risk is considered to be low.
- At the time of the inspection, the barricade at the top of the ramp had been knocked over. The barricade was moved back into place during the inspection.

East Wall and South Walls

Observed Slope Performance

Goose Open Pit - North Waste Rock Dump

- The dump is inactive and access is prevented by both a rockfill berm and the presence of water pipes across the access point.
- The dump has been subsiding since 2015. The settlement is attributed to the deposition of water in the open pit, through a combination of thawing and increasing porewater pressure. The concern is that a sudden failure of the dump would create a wave that poses a hazard to personnel conducting water quality or tailings sampling in the pit lake.
- The settlement has resulted in a series of scarps along the dump platform up to approximately 1 m in height (see photos below). The settlement has notably progressed since the 2022 inspection.
- The settlement is monitored as part of monthly inspections by the Geotechnical Group. Four survey pins were installed in August 2022 and measurements made in September 2022, May 2023 and June 2023. The cumulative displacement is between 20 and 100 mm. The rate is less than 0.5 mm/day.
- The visual monitoring and the survey pin measurements should continue on a monthly basis while access is still required to the open pit. There is a need to better quantify the extents and total deformation. Recommend using drone photogrammetry to assess this on an annual basis.

Looking North, with Settlement and Scarps Visible

Looking East at Settlement and Scarps on the Dump Platform

Observed Slope Performance

Portage Open Pits - General

- Pit A, Pit E, B Dump, C Dump and D Dump are shown at right. Mining of the open pits is complete. Pits B, C and D have been backfilled with waste rock. The waste rock dumps extend along the southwest wall of Pit A and the north wall of Pit E. The dumps are no longer active.
- Pit A is being used for water management. The water elevation was 5100.6 mRL at the time of the inspection. Pit A has a final floor elevation of 4997 mRL and a crest elevation of 5151 mRL.
- Tailings are being deposited in Pit E from a spigot point at the crest of the West Wall. The tailings were at an elevation of approximately 5073.9 mRL and the water at an elevation of 5084.8 mRL at the time of the inspection. Pit E has a final floor elevation of 4976 mRL and a crest elevation of 5130 mRL.
- Access to the open pits is infrequent, typically limited to monthly water quality sampling when the pit lakes are not frozen.
- The South Wall of Pit E was instrumented with TDR cables, an inclinometer, VWPs and thermistors. These instruments are no longer monitored from a geomechanical perspective. The instrumentation is discussed later in this presentation.
- Observations made during the inspection are summarized on the following slides.

Observed Slope Performance

Pit A - General

- Approximately one and a half benches are exposed above the pit lake.
- No significant change was observed in the pre-existing bench-scale failures remaining above the pit lake since the 2022 inspection.
- Access to the East Ramp is restricted by berms at the top and bottom of the ramp (not shown in photo below).
- No particular geomechanical concerns were noted.

Observed Slope Performance

Pit A - South Wall Ramp

- The south ramp is used to access the pit lake and water management infrastructure is present along the ramp.
- No particular geomechanical concerns were noted. With the rising water level, the ramp is no longer exposed to rockfall hazards associated with the pit slopes.
- The PTO / Pump controls are located well up the ramp, away from the pit lake, mitigating the risk associated with a wave caused by a failure of the open pit slope or the dump.
- Access below the pump controls is restricted by pylons.
- Specific geomechanical considerations relating to Dump B are discussed on the next slide.


South Ramp, Looking North with PTO/Pump Controls at Left

Observed Slope Performance

B Dump - General

- The Pit B Dump consists of an Upper and Lower Platform, both of which are inactive. Access to both platforms is prevented by berms.
- Failures of the dump slope are possible as the pit lake elevation rises but have not been observed to date. Such a failure could cause a large wave in the pit lake that poses a hazard to personnel conducting water sampling or managing the reclaim water lines.
- Tensions cracks are observed on both platforms. The northern end of the Lower Platform has settled, and sinkholes have also formed at the southern end of the Lower Platform. These are discussed on the following slides.
- A visual inspection of the dump is completed on a monthly basis. Recommend continuing the inspections while access continues to the Pit A South Ramp below the dump. An extensometer has been installed on the lower platform and this is described further on a following slide.
- The possibility of the settlement progressing back to the Amaruq Road was discussed in 2022 and concluded to be unlikely as the settlement and tension cracks appear to be limited to within the footprint of the pit. SNC Lavalin was retained to complete a detailed assessment and the results should be reviewed when they become available.

Observed Slope Performance

B Dump - Lower Dump Platform

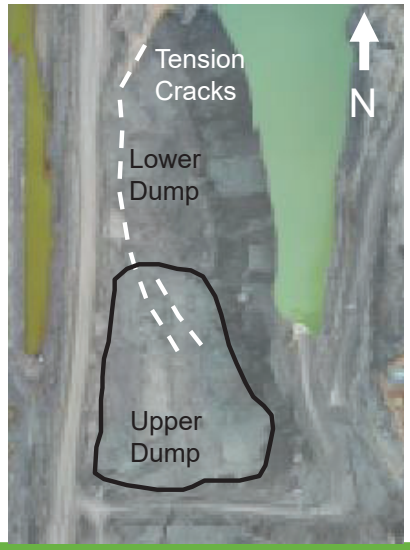
- Tension cracks are present along the western limit of the dump and are believed to be above the crest of the East Ramp of the open pit. The tension cracks and associated settlement appear to have progressed since the 2022 inspection.
- The interpretation of the tension cracks (i.e., whether they indicate deep-seated movement of the dump or simply differential settlement across the position of the bench/ramp below the dump) relies on their position relative to the underlying pit ramp. Recommend surveying the cracks to confirm their position relative to the geometry of the pit slope below the dump.
- An extensometer was installed in September 2022 and readings have been taken approximately monthly. The displacement over 9 months has been 26 cm and the displacement rate has been steadily decreasing from a high of 1.4 mm/day in December 2022 to just under 1 mm/day at the time of the visit.
- There has been limited change in the sinkholes and area of historical settlement since the 2022 inspection.
- Recommend continuing to monitor the settlement and tension cracks on the dump.

Observed Slope Performance

B Dump - Upper Dump Platform

- Tension cracks have developed on the Upper Platform since the 2022 inspection. The cracks are oriented roughly NW-SE and appear to be a continuation of those observed on the Lower Platform, suggesting that they are also linked to the geometry of the underlying pit slope. The position of the cracks should be surveyed to confirm this.
- The Upper Platform is graded so that water flows to a low point above the area of the Lower Platform where the sinkholes have formed. Previous annual inspections recommended filling the low point and re-grading the dump to reduce water infiltration. This work has not been completed. However, the dump performance is believed to be controlled by the pit water level rather than surface water infiltration and the recommendation is no longer considered necessary.

On Upper Platform, Looking Southwest



Observed Slope Performance

C Dump

- The C Dump, which backfilled Pit C, is located between Pits A and E and is inactive. Access to the dump platform is permitted but a berm has been constructed approximately 25 m back from the crest of the dump above Pit A.
- The ABF Garage was constructed on the C Dump platform in 2020, approximately 35 to 45 m from the crest of the dump. Settlement of the dump is expected as the water elevation in Pit A and the water/tailings elevation in Pit E reach and surpass the base of the dump. As a result, it was recommended that the garage be relocated. Since the 2022 inspection, the ABF Garage has been dismantled and moved off of the dump.
- A seacan used to provide power to the Pit A pumps was located inside the berm constructed along the crest. Since the 2022 inspection, the seacan has been moved outside of the berm. However, an electrical control panel remains inside the berm. Recommend relocating the control panel before the water elevation in Pit E reaches the base of the upper dam platform.
- As no evidence of instability has been observed, the on-going use of the dump as a laydown is considered acceptable.


Electrical Seacan Outside Berm


Electrical Panel at Crest, Inside Berm


C Dump, Looking East with Garage Removed

Observed Slope Performance

D Dump

- The D Dump backfilled Pit D and forms the north wall of Pit E. The Pit E Northwest ramp runs along the western toe of the dump.
- Access to the top of the dump is restricted by a berm.
- The southwestern end of the dump started to settle in 2017. Tension cracks are visible in this area as well as along the crest immediately to the north. The current conditions are described on the following slides.
- Four wirelines extensometers have been installed at the crest of the dump in the area of settlement and tensions cracks and are discussed on a following slide.
- The dewatering pumps for Pit E are located at the toe of the dump. The pumps have progressively moved up the ramp, reducing the exposure of personnel.

D Dump, Looking Northeast

Observed Slope Performance

D Dump - North End

- The north end of the dump is adjacent the Pit E Northwest ramp. Tension cracks previously formed along the crest of the dump in this area. There has been limited change in the tension cracks since the 2020 inspection and bulging of the toe of the slope was not observed.
- Seepage was observed at the toe of the dump in this area during the 2022 inspection. The seepage has been monitored and has reduced significantly.
- Wireline extensometer #2 was installed at the crest of the dump in the area of the tension cracks in 2019. The extensometer is monitored monthly. The data are discussed later in this presentation, but the deformation rate is currently less than 1mm/day.
- The monitoring and the monthly visual inspections should continue while access to the Pit E Northwest ramp is still required.

D Dump, Looking South

Observed Slope Performance

D Dump - South End

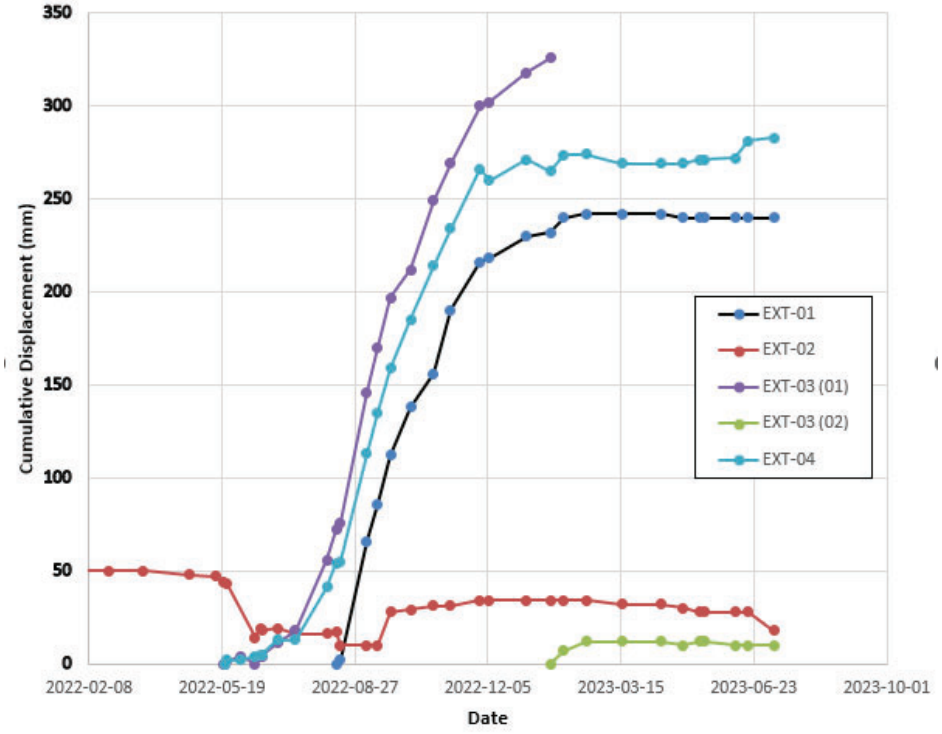
- Deformation and settlement of the southwest corner of the dump has been on-going since 2017. This was previously restricted to a small portion of the dump.
- Since the 2021 inspection, a network of tension cracks have developed on the dump platform and the extensometers have been installed to monitor displacement across them.
- The Geotechnical Group has been painting the cracks to track their change over time. This is endorsed and should continue.
- The tension cracks suggest that the direction of movement is oriented more to the southwest (i.e., towards the point where the Pit E Ramp terminates in the pit lake) than to the south, directly towards the pit lake. The reason for this is not currently known. The tensions cracks should be surveyed to confirm this.
- On-going deformation of the dump could result in a rockfall hazard to the ramp. A berm is currently in place at the toe of the dump but its capacity and evidence of rockfalls should be monitored and documented.

Tension Cracks on Dump, Looking Southeast

Observed Slope Performance

D Dump - Extensometers

- A total of four wireline extensometers were installed at the crest of Dump D and above the northern ramp into Pit E in response to the development of tension cracks on the upper platform of the dump.
- The Geotechnical Group commit to monitoring the extensometers on a monthly basis. In practice it is typically done every two weeks.
- Monthly readings are available since June 2021 for the first two extensometers and since May 2022 for the second two extensometers. As the tensions cracks have progressed behind the extensometers, they have been moved, resetting the data. The data are shown at right.
- All extensometers reported an increase in displacement between May and December of 2022. The rate increased from less than 0.5 mm/day to up to 3.5 mm/day. The displacement rate has since decreased to less than 1 mm/day.
- The reason for the increase and subsequent decrease is unclear. While evidence of tension cracks has been observed behind several of the extensometers, it is considered unlikely that this explains the change in behaviour.
- In all cases, the current rate of <1 mm/day is much less than the 50 mm/day threshold that would trigger a response under the procedure. Continue monitoring the extensometers and relocate them if cracks extend behind them.



Observed Slope Performance

Pit E - General

- Approximately two and a half benches are exposed above the pit lake.
- The wall is performing well and no particular geomechanical concerns were noted.
- No significant change in the historical bench-scale instabilities along the south wall were observed.
- The ramp along the south wall is closed with a berm.
- The ramp at the north end of the open pit is described on a following slide.

East and South Walls, Looking East

Observed Slope Performance

Pit E - Southwest Wall

- Approximately three benches in the Ultramafics are exposed above the pit lake. The wall is within talik.
- Tailings are discharged from a line at the crest of this wall. There have been concerns about the potential for erosion of the benches or slope instability due to water infiltration. Limited erosion (crest loss) of the bench directly below the discharge point has been observed, but no evidence of slope instability has been observed. The wall is performing well.
- Seepage was observed from the prominent structure to the left of the tailings discharge point (outlined below). Seepage has not been observed during previous inspections. However, the structure does not appear to have deteriorated over the past several years and there is no obvious evidence of movement.
- Recommend continuing the monthly visual inspections to monitor the area for bench degradation, erosion, tension cracks, seeps, etc.

Southwest Wall, Looking West

Observed Slope Performance

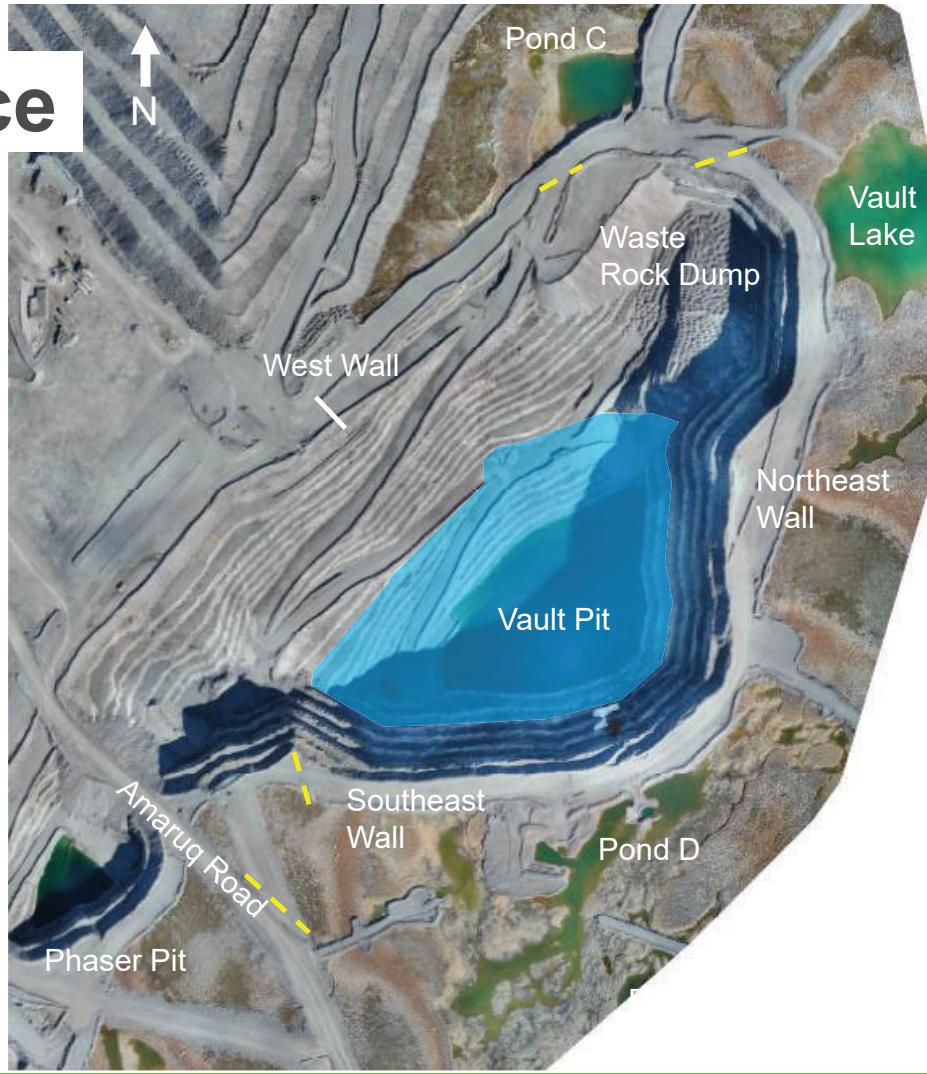
Pit E - Northwest Wall and Ramp

- The Northwest Ramp is used to access the pit lake and water management infrastructure is present along the ramp.
- Several rockfall hazards were identified during previous inspections. Many of these hazards have been flooded by the rising pit lake and no longer pose a risk to personnel. However, rockfall hazards remain on the Northwest Wall adjacent to the pumps. As the water level rises and the pumps are moved up the ramp, the exposure to personnel and equipment will continue to reduce.
- A rockfall berm has been in place for several years and has been effective at managing rockfalls. A second berm was constructed in 2021 further from the wall.
- A 450 tonne rockfall occurred in early June 2023 where the Bay Fault intersects a nose in the wall (outlined below). The failed material was contained by the rockfall berms. This area was identified as a hazard during previous inspections and it is likely that rockfall will continue to occur in the area. The berms have capacity to retain additional rockfalls, but geomechanical inspections of the area should continue while access to the ramp is still required.

Observed Slope Performance

Vault Open Pit - General

- Observations made during the inspection of the Vault open pit are summarized on the following slides.
- The approximate current pit geometry is shown at right (as of 2021).
- Mining of the open pit was completed in March 2019. An inactive in-pit dump is present along the North Wall of the open pit.
- The open pit reached a final floor elevation of 4955 mRL, with a crest elevation of 5137 mRL.
- Access to the open pit is limited to monthly water quality sampling when the pit lake is not frozen.
- At the time of the inspection, access to the open pit was restricted by a barricade. Access to the ring road is restricted by berms at the north and south ends of the road. The barricade (white) and berms (yellow)are shown at right.
- The open pit is partially flooded. The elevation of the pit lake was last measured in June 2022 when it was approximately 5039 mRL. It has since risen to flood the area approximately shaded in blue in the image at right.
- The Amaruq All Weather Road (AWR) crosses between the Vault and Phaser Pits on a rockfill embankment.



Observed Slope Performance

Vault Open Pit – Northeast and Southeast Walls

- The walls are performing well. No particular geomechanical concerns were noted.
- The ice wall continues to form each winter on and below the talik zone in this wall. Limited seepage through the rock was observed at the time of the inspection. Water was also observed flowing from Pond D, to the south of the pit, under the ring road and down the wall.
- Access to / below the North Waste Rock Dump is no longer possible, reducing the risks associated with a failure of the dump.

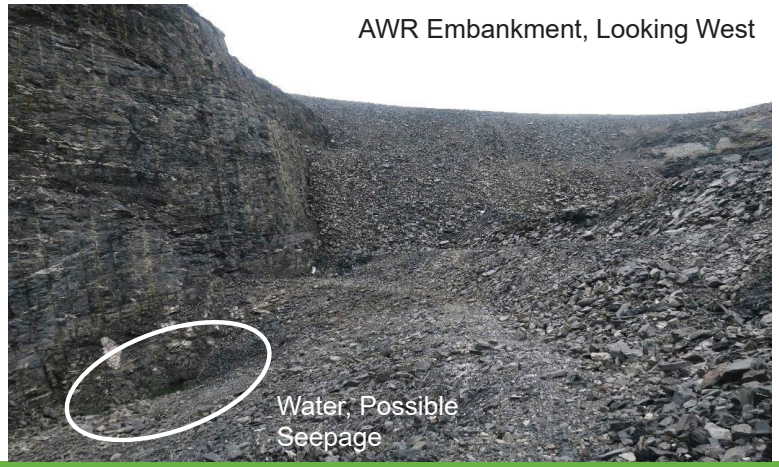
Northeast and Southeast Walls, Looking East

Observed Slope Performance

Vault Open Pit - Southwest Wall

- The Amaruq AWR crosses a saddle between the Vault and Phaser pits on a rockfill embankment.
- During the winter, the visual inspections identified tension cracks on the surface of the road, perpendicular to the axis of the road. The reported positions of the cracks do not correlate with the underlying open pit benches and the cause of the cracks is not known. The mine responded in a reasonable way by temporarily increasing the frequency of inspections. The cracks have not been observed since February.
- No evidence of instability in the AWR embankment was observed during the inspection (e.g., no tension cracks on the road surface or bulging of the embankment toe)
- The stability of the Amaruq AWR embankment could be impacted if the water level in the Phaser Pit on the other side of the embankment increases and water ponds behind the embankment. This has not occurred. A small pool of water was observed near the base of the embankment at the time of the inspection and may be associated with seepage. The presence of seepage should continue to be evaluated as part of the monthly inspections. Recommend noting the importance of this in the GCMP.

Southwest Wall, Looking Southwest



Observed Slope Performance

Vault Open Pit - West Wall

- The West Wall is located along the footwall of the deposit. The wall was established with 7 m high single benches without pre-shear and commonly failed or were scaled back to the foliation. The ramp is located along this wall.
- At the time of the inspection, access to the ramp was restricted by a barricade. Personnel must contact the Geotechnical Group before entering the open pit; this is understood to be limited to monthly water quality monitoring during the summer.
- Rockfall hazards are present along the ramp. However, the ramp is sufficiently wide that personnel are able to stay well away from the benches when accessing the pit. Limited evidence of rockfall was observed at the toe of the benches during the inspection.
- While the ramp is inspected as part of the monthly geomechanical inspections, the condition of the ramp is not documented in the inspection report. The ramp should be included in the inspection report. The inspections should continue to consider the open pit walls and in-pit dumps, as well as the integrity of the Ring Road between the open pit and Vault Lake as a failure could result in a wave in the pit lake or inrush to the open pit.

West Wall, Looking North

Observed Slope Performance

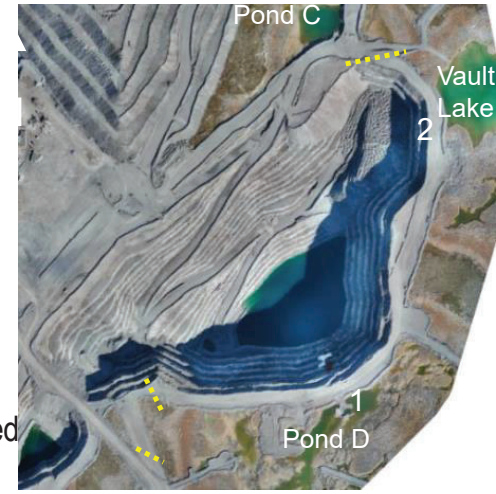
Vault Open Pit - North Waste Rock Dump

- A waste rock dump was constructed at the north end of the Vault Pit. The dump is inactive and consists of two platforms with elevations at approximately 5133 mRl and 5082 mRL.
- Settlement and tension cracks were observed at the crest of the upper platform at the north end of dump during the 2019 inspection. There appears to have been little change since that time. The affected area is relatively small and is not above the ramp.
- No other evidence of instability was observed during the inspection.
- Access to the dump is prevented with a berm.

Looking West at Area of Settlement

Observed Slope Performance

Vault Open Pit - Ring Road



- A berm has been constructed at both ends of the Ring Road to prevent access (yellow dashed lines at right). Several geomechanical hazards have previously been identified along the road (numbered at right):
  1. Seepage from Pond D has flowed under the road and down the pit wall in 2019, 2021, and again in 2023.
  2. Subsidence of the road has occurred adjacent Vault Lake. The subsidence appears to be largely unchanged since the 2022 inspection. Limited seepage was observed below road. The potential for a sudden inrush of water from Vault Lake into the open pit was previously identified as a hazard in the event of a breach or erosion of the Ring Road in this area. As a result, the area should continue be inspected prior to accessing the open pit. Alternatively, the road could be purposely breached in this area to eliminate the hazard.

Area 2 Looking Southwest with Subsidence

Observed Slope Performance

Phaser and BB Phaser Pits - General

- Observations made during the inspection of the Phaser and BB Phaser open pits are summarized on the following slides.
- Mining of the open pits is complete. The approximate current pit geometry is shown at right.
- The open pits are partially flooded. The elevations of the pit lakes are not recorded, but estimates are shown at right.
- Access to the BB Phaser open pit is limited to monthly water quality sampling when the pit lake is not frozen. There is no access to the Phaser Open Pit.
- At the time of the inspection, the accesses to the open pits were barricaded by berms (shown as dashed lines at right).
- Note that the Amaruq All Weather Road (AWR) crosses between the Vault and Phaser Pits on a rockfill embankment.
- AEM continues to complete monthly geomechanical inspections of the open pits. The AWR is also included in the inspections. These inspections should continue, though the open pit inspections could be discontinued during periods when water quality sampling is not occurring.

Observed Slope Performance

Phaser Open Pit - General

- The open pit is partially flooded, limiting the current rock exposures to a single bench. No particular concerns were noted.
- Access to the open pit is prevented by a berm.
- No evidence of instability was observed in the Amaruq AWR embankment.
- Water inflow, likely from the BB Phaser pit, was observed at the south end of the pit. The stability of the Amaruq AWR embankment could be adversely impacted if the water level in the Phaser pit increases and water ponds behind the embankment. A visual assessment of the water level in the open pit has been incorporated into the monthly inspections since the last inspection. The pit lake elevation does not appear to have significantly changed since the 2021 inspection.

Observed Slope Performance

BB Phaser Open Pit - General

- The open pit is flooded, with no rock slopes visible.
- Access to the open pit is prevented by a berm.
- No particular geomechanical concerns were noted.

Monitoring and Inspections

Monitoring and Inspections

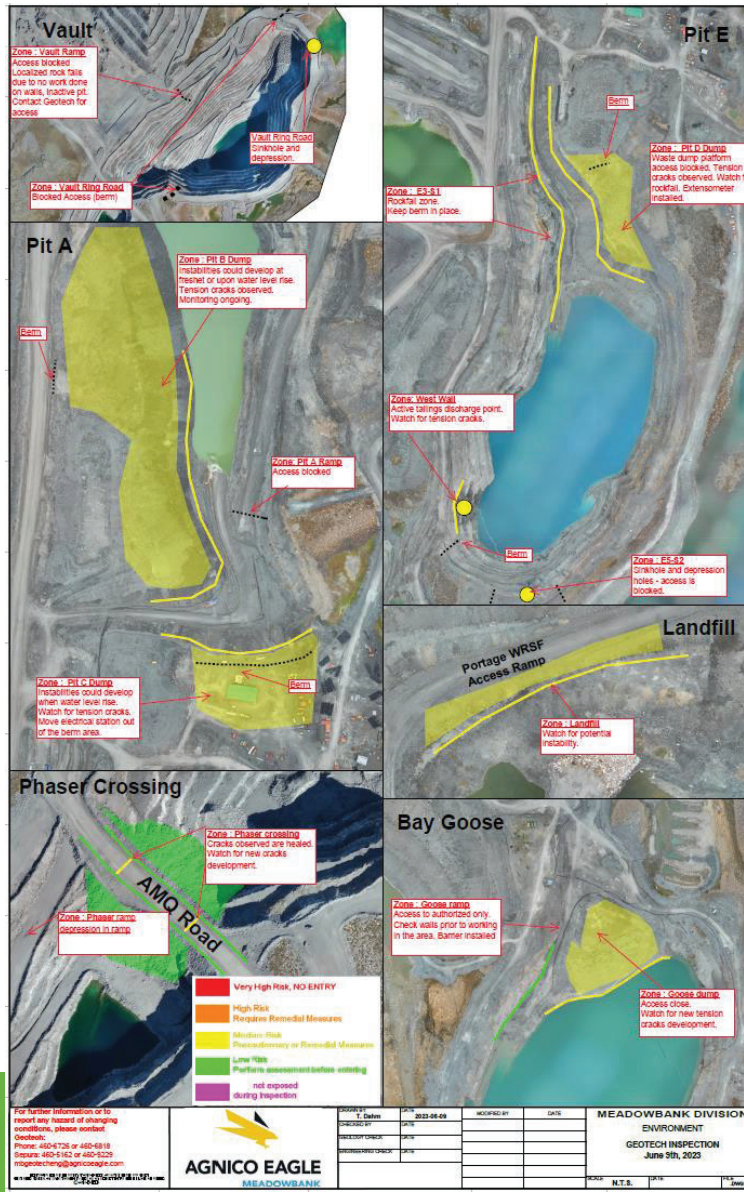
Inspections

- Visual inspections are completed by the Geotechnical Group on a monthly basis and a summary report and map issued. The inspection procedure has been updated to define criteria when additional inspections are required.
- The Rock Mechanics Group now commits to an annual over-inspection of the open pits and in-pit dumps at the Meadowbanks site. This inspection was completed in April 2023.
- A selection of the inspection reports were reviewed. Most of the key hazards identified during the 2023 annual inspection are included in the monthly reports. However, the ramps used to access the pit lakes in the Portage Pit A and Vault Pit are not. Recommend including these areas in the inspections, at least during periods when access to the ramp is required (e.g., for pump maintenance or water quality sampling).
- The 450 tonne rockfall that occurred along the North Ramp of Pit E in June 2023 was reported to the WSCC.

Monitoring and Inspections

Hazard Assessment

- The most recent hazard assessment map (June 9, 2023) was reviewed. A summary is shown at right and comments are provided below.
- All of the hazards identified during the annual inspection have been captured by the hazard assessment.
- The risk ratings assigned to the identified hazards are thought to be generally reasonable.
- The drone photos used for the hazard map are significantly out of date and do not reflect the reduction in slope hazards / accessible areas as the pit lake elevations rise. The drone photos should be updated to reflect the current conditions.



Monitoring and Inspections

Instrumentation

Wireline Extensometers

- Four wireline extensometers are installed on Dump D and a single wireline extensometer was installed on Dump B. The Geotechnical Group commit to monitoring the extensometers on a monthly basis, with more frequent readings depending on the observed displacement. Monitoring requirements are set out in the procedure "Wireline Extensometer Monitoring in Rock Storage Facility". The procedure also defines displacement rate thresholds and the associated responses.
- The extensometer data have started being plotted since the 2022 inspection, and the plots are included in the monthly inspection reports.
- Several of the extensometer graphs are plotting incorrect values. The graphs and underlying data should be reviewed and cleaned up.
- The TARP for the extensometers is based on a daily deformation rate. This is currently calculated by dividing the total deformation to date by the elapsed time (over a year in some cases) which can mask sudden changes. The deformation rate should be calculated over a shorter period, such as since the last reading, so that it can be compared directly to the TARP.

Survey Pins

- Four survey points were installed on the Goose Waste Rock Dump. The Geotechnical Group commit to monitoring the survey pins on a monthly basis outside of winter, with more frequent readings depending on the observed displacement.
- Monitoring requirements are set out in the Meadowbank Open Pit Surveillance Program procedure.
- The survey pin data are also graphed. Similar to the wireline extensometer data, the deformation rate is calculated as an average of the lifespan of the pins. The deformation rate should be calculated over a shorter period, such as since the last reading.

Monitoring and Inspections

Instrumentation (Cont'd)

Piezometers and Thermistors

- A series of piezometers and thermistors were installed at many of the open pits. These instruments are no longer monitored from a geomechanical perspective.
- The VWPs and thermistors at Pit E are monitored by the Geotechnical Group from an environmental perspective given the deposition of tailings in the pit.
- The VWPs and thermistors at the Goose Pit are no longer monitored from an environmental perspective as tailings deposition has stopped. There may be value in monitoring these instruments periodically from an environmental perspective given the potential for future tailings deposition.

TDRs and Inclinometers

- TDR cables were installed at Pit E and the Goose Pit and an inclinometer was installed at Pit E. These instruments are no longer monitored.

Other

- The tension cracks in the waste rock dumps are periodically marked with spray paint to make it easier to identify changes over time.
- The extensometers and survey pins provide point measurements of displacement. An annual assessment using drone photogrammetry is recommended to better understand spatial patterns in the displacement.

Monitoring and Inspections

Ground Control Management Plan (GCMP)

- The GCMP for the Meadowbank Site was last updated in 2018 and has been discontinued.
- The inspection and monitoring commitments were documented in the “Meadowbank Open Pit Surveillance Program” procedure and appended to the most recent version of the GCMP for the Amaruq site issued in February 2023. This is an important improvement.
- There remains a need to reference key sources of information on the open pits (e.g., a list of reports) so that the information is not lost. This could be included as a section in the GCMP or as a stand-alone document referenced by the GCMP.


THANK
YOU